DISTRIBUTION AND NUMBERS OF SNOWY OWLS ON MELVILLE, EGLINTON, AND BYAM MARTIN ISLANDS, NORTHWEST TERRITORIES, CANADA

by
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ABSTRACT. During aerial surveys of Melville, Eglinton, and Bryam Martin Islands, Queen Elizabeth Group, in 1972, 1973, and 1974, numbers of Snowy Owls (*Nyctea scandiaca*) were recorded. Both high and low numbers were observed and were not found to be in phase in the different areas surveyed. The lack of phasing is attributed to regional asynchrony in lemming (*Dicrostonyx groenlandicus*) cycles caused in turn by differences in snow cover and duration of springtime snow melt.

Introduction

There are few references to Snowy Owls on the western islands of the Queen Elizabeth Islands of Artic Canada (MacDonald 1954, Tener 1963, Taylor 1974a, 1974b). As the birds are relatively easily seen from the air, they were counted during our aerial surveys of Peary caribou (*Rangifer tarandus pearyi*) and musk oxen (*Ovibos moschatus*) on Melville, Eglinton, and Byam Martin Islands in 1972, 1973, and 1974.

The results from the 1972 survey (Miller and Russell 1973) demonstrated marked variations in owl density on different parts of Melville. In this paper, data from 1972, 1973, and 1974 are used to show differences in phasing of population fluctuations on different parts of the survey area.

Methods

In 1972 Melville, Eglinton, and Byam Martin were surveyed by Bell 206 helicopter between 7 and 24 August. In 1973 (5 July to 8 August) and 1974 (25 July to 21 August) they were surveyed by Helio-Courier fixed-wing aircraft.

Transect intervals on Melville were 6.4 km (4 mi) for all three surveys. On Byam Martin they were 6.4 km (4 mi) in 1972 and 1973, and 3.2 km (2 mi) in 1974. On Eglinton they were 6.4 km (4 mi) in 1972, and 3.2 km (2 mi) in 1973 and 1974. A strip 0.8 km (0.5 mi) wide was searched by an observer on each side of the aircraft. The surveys were flown about 150 m (500 ft) above ground level, except where the broken terrain of western Melville forced the flights to be about 300m (1,000 ft) above ground level. The surveys were flown at speeds averaging aboub 160 km/hour (100 mi/hour).

Eglinton and Byam Martin were small enough to be surveyed without stratification. Melville, however, was divided into 13 strata based on navigational and physiogeographical considerations. The 13 strata were regrouped as 9 for the reporting of observations of Snowy Owls by subjectively combining land areas of apparent ecological similarity (Fig. 1).

Results and Discussion

The observed and estimated numbers of owls by island and survey period are given in table 1. Owl densities and numbers are related to strata in figure 1.

Interpretations and extrapolations from the aerial surveys are subject to error inherent in the technique. For example, differences were observed in the reactions of the owls to the types of aircraft used. In 1972 owls seemed to be flushed readily by the helicopter and were thus easily seen. In 1973, when a fixed-wing aircraft was used, many owls were not flushed, and probably some that remained on the ground were missed. In 1974, when again a fixed-wing aircraft was used, we recorded whether or not the owls flushed. Of the owls seen on Melville 49 percent did not flush, whereas 33 percent of those owls seen on Eglinton did not flush. That difference suggests that more perching owls were missed on Eglinton where patches of snow occurred on the high ground. In both 1972 and 1974 some strata were not surveyed (table 1) because of weather and mechanical delays. The low numbers of owls on some small areas could produce imprecise estimates due to chance, such as on Byam Martin and Canrobert Hills in 1973 and Stevens Head in 1974. In other areas near to each other, however, the high numbers suggest that the between-year and between-area differences were real.

According to our data, owl numbers on Eglinton, Byam Martin, Sabine Peninsula, East Central, and Central Melville peaked in 1973, but on the Dundas Peninsula they decreased each year from 1972 through 1974. Changes on the Canrobert Hills from 1973 to 1974 were in phase with the changes on the five synchronous areas mentioned above. However, on Sandy Point, Stevens Head, and Cape Russell owl numbers increased from 1973 to 1974.

The highest density (10.28 owls/100 km^2) and number (143 owls) on any stratum were estimated on Sandy Point in 1974. The second highest density (7.18 owls/100 km^2) and number (111 owls) were estimated in the previous year (1973) on Eglinton Island about 50 km away.

Aerial and ground observations suggest that few owls nested in 1972; more nested in 1973; and none were seen on nests in 1974. Taylor (1974b) observed that average clutch size of owls on Bathurst Island in 1969 was 5.8, yet an average of only 1.1 owlets per nesting pair were successfully raised. Therefore it is unlikely that offspring returning to the Queen Elizabeth Islands could account for the overall increase in number of owls between 1972 and 1973 or the increases on some strata between 1973 and 1974. Adult owls must shift their summer ranges from year to year.

Most of the owls were seen as individuals, but a group of three was seen on Dundas Peninsula in 1972, and a group of four on Eglinton in 1974. In areas of high densities the distances between owls on the same transect were measured. The mean ± standard error (se) distance of 22 intervals between owls on Sandy Point in 1974 was 5.2 ± 0.9 km (3.2 ± 0.5 mi) with a range of 0.4-15.6 km (0.2-9.7 mi). Similarly the mean ± se for 30 intervals between owls on Eglinton in 1973 was 5.5 ± 0.7 km (2.3 ± 0.4 mi) with a range of 0.8-14.4 km (0.5-8.9 mi). In 1974 the mean ± se distance and range of 8 intervals between owls on Eglinton was lower: 3.9 ± 1.4 km (2.4 ± 0.9 mi), 0.4-11.6 km (0.2-7.2 mi).

The only previous count of owls on the area studied was during the summer of 1961 (Tener 1963). While flying aerial transects spaced 6.4 km (4 mi) apart, Tener (1963) saw 6 owls on Eglinton and 51 on Melville west of 111° W, of which 36 were on the Dundas Peninsula. He saw only 3 on the part of Melville east of 111° W. He did not survey Byam Martin.

There are no comparable data for owls on the western Queen Elizabeth Islands from 1961 to 1972 although ground estimates were made between 1968 and 1971 (Taylor 1974b) during a study on Bracebridge-Goodsir lowlands, central Bathurst Island. Taylor noted irregular fluctuations in the numbers of owls on his study area (54 km^2, 21 sq mi). The density was higher in 1969 than in 1968, 1970, or 1971. In 1969, the year of greatest abundance of lemmings (*Dicrostonyx groenlandicus*), 15 pairs of owls nested and 13 pairs completed clutches. In 1971 only one breeding pair was found, and no eggs hatched. No nesting owls were found in either 1968 or 1970. Snow cover records for 1965-74 from the weather station at Resolute Bay, Cornwallis Island (Atmospheric Environmental Service), show that snow cover in 1968-69 was below the nine-year average and the lowest of the four winters during Taylor's study.

The fluctuations in owl numbers and their differences in phasing in different areas are most likely related to variations in lemming densities. Lemmings were scarce on Melville in 1972 but abundant in 1973. In the latter year fresh diggings at burrow entrances were noticeable in all strata after each rainfall, and lemmings were readily seen at camps and fuel caches. During the spring of 1974, lemmings appeared numerous near our camp on the Sabine Peninsula, but their numbers decreased rapidly during the prolonged snow melt in June and July. Similar observations were made on Bailey Point (Cape Russell) in 1974 (G. R. Parker pers. comm.) and in the Bracebridge-Goodsir Inlet area of Bathurst Island (D. A. Gill pers. comm.). Taylor (1974b) found that lemmings were the commonest prey item, 90 percent by volume, in most Snowy Owl pellets collected on Bathurst. On Southampton Island, Northwest Territories, lemming population (*D. groenlandicus* and *Lemmus trimucronatus*) peaked in the summer of 1970, and nesting Snowy Owls were abundant (Parker 1974). However, lemming numbers crashed in the winter of 1970-71, and Parker saw no Snowy Owls on the island in the summer of 1971.

The increase in numbers of owls on Eglinton, eastern Melville, and Byam Martin from 1972 to 1973 was probably in response to increased numbers of lemmings in 1973. The increased number of lemmings may have resulted from high survival due to an early spring and rapid snow melt.

Similarly, in 1974 the snow cover may have influenced lemming survival and hence owl numbers. Snow cover on western Melville was lighter and melted faster than on eastern Melville, and that condition may have favored survival of lemmings on western Melville or facilitated the hunting success of the owls or both.

On the western Queen Elizabeth Islands the Snowy Owl appears to be a highly nomadic and an opportunistic species, varying its distribution and breeding according to the numbers of its principal prey. Marked fluctuations in numbers have been described which were not in phase for all areas. This probably reflects regional differences in lemming cycles as well as duration and depth of snow cover. We suggest that an essential factor in lemming survival on the High Arctic Islands of Canada is the duration of springtime snow melt, a prolonged period of slushy, deep snow being unfavorable for lemming survival.

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Table 1
Number of Owls Seen on Transect and
Estimated Numbers of Owls on Melville, Eglinton, and Byam Martin islands,
Northwest Territories, 1972, 1973, and 1974

Survey Area	Owls Observed			Estimated Owls		
	1972	1973	1974	1972	1973	1974
Sabine Peninsula	0	6	0	0	22	0
East Central	2	9	7	9	38	30
Central	0	2	0	0	8	0
West Central	N*	1	N	–	4	–
Dundas Peninsula	20	10	3	79	40	12
Sandy Point	–	2	36	–	8	143
Canrobert Hills	–	5	3	–	20	12
Stevens Head	–	1	3	–	4	12
Cape Russell	–	1	16	–	4	63
Melville–Total	22	37	68	88	148	272
Eglinton	5	56	27	20	111	54
Byam Martin	1	3	0	4	12	0

*Areas identified by dash not surveyed

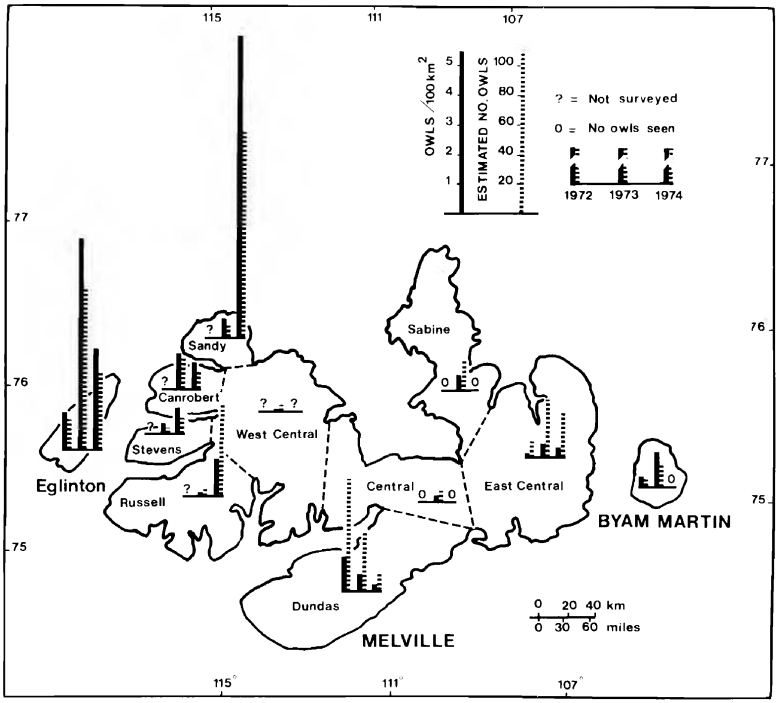

Figure 1. Distribution of Snowy Owls by estimated densities and numbers on Melville, Eglinton, and Byam Martin islands, Northwest Territories, 1972-74.